99B-168

4.5 PSP Cover Sheet (Attach to the front of each proposal)

Proposal Title: **Venice Island Potato Slough Habitat Creation Demonstration Project**
Applicant Names: **California Department of Water Resources**
Mailing Address: **3251 "S" Street, Sacramento, California 95816**
Telephone: **(916) 227-7567**
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Email: **Schmutte@water.ca.gov**

Amount of funding requested: $ Phase 1A $ 270,991 1 year; Phase 1B $220,232 4 to 7 months

Indicate the Topic for which you are applying (check only one box)

- ☐ Fish Passage/Fish Screens
- ☑ Habitat Restoration
- ☐ Local Watershed Stewardship
- ☐ Water Quality
- ☐ Introduced Species
- ☐ Fish Management/Hatchery
- ☐ Environmental Education

Does the proposal address a specified Focused Action? ✓ yes ____ no

What county or counties is the project located in? San Joaquin County

Indicate the geographic area of your proposal (check only one box):

- ☐ Sacramento River Mainstem
- ☐ Sacramento Trib: ____
- ☐ San Joaquin River Mainstem
- ☐ San Joaquin River Trib: ____
- ☑ Delta: Central Delta—Potato Slough
- ☐ East Side Trib: ____
- ☐ Suisun Marsh and Bay
- ☐ North Bay/South Bay: ____
- ☐ Landscape (entire Bay-Delta watershed)
- ☐ Other: ____

Indicate the primary species which the proposal addresses (check all that apply):

- ☑ San Joaquin and East-side Delta tributaries fall-run chinook salmon
- ☐ Winter-run chinook salmon
- ☐ Late-fall run chinook salmon
- ☑ Delta smelt
- ☑ Splittail
- ☑ Green sturgeon
- ☑ Migratory birds
- ☐ Other: ____
- ☐ Spring-run chinook salmon
- ☑ Fall-run chinook salmon
- ☑ Longfin smelt
- ☑ Steelhead trout
- ☑ Striped Bass
- ☐ All chinook species
- ☐ All anadromous salmoids

Specify the ERP strategic objective and target(s) that the project addresses. Include page numbers from January 1999 version of ERP Volume I and II:

Ecological Processes: *Natural Floodplains and Flood Processes* (VI-p. 83; Target 1, Programmatic Action 1G, VII-p. 92); *Delta Channel Hydraulics* (VI-p. 91; Target 2, Programmatic Action 2A,VII-p. 93); *Bay-Delta Aquatic Food-Web* (VI-p. 95; Target 1, Programmatic Action 1A, VII-p.95). **Habitats:** *Tidal Perennial Aquatic Habitat* (VI-p.111;

I-016113

Target 1, Programmatic Action 1E,VII-p. 96); *Delta Sloughs* (VI-p. 120; Target 1, Programmatic Action 1A, VII-p.98); *Mid-channel Islands* (VI-p. 125; Target I, Programmatic Action 1B, VII-p. 98); *Fresh Emergent Vegetation* (VI-p. 136; Target 1, Programmatic Action 1E, VII-p. 100); *Freshwater Fish Habitats* (VI-p. 155; Target 1, VII-p.104); *Essential Fish Habitats* (VI-p. 160). **Species- Priority Group I:** *Delta Smelt* (VI-p. 191); *Longfin Smelt* (VI-p. 196); *Green Sturgeon* (VI-p. 203); *Splittail* (VI-p. 207); *Chinook Salmon* (VI-p. 211); *Steelhead Trout* (VI-p. 225). **Species- Priority Group II:** *California Black Rail* (VI-p. 247); *Tidal Brackish and Freshwater Marsh Special-status Plant Species* (VI-p. 271). **Species-Priority Group III:** *Sacramento Perch* (VI-p. 297); *Western Least Bittern* (VI-p. 308). **Species- Priority Group IV:** *Native Resident Fish Species* (VI-p. 345); *Bay-Delta Aquatic Foodweb Organisms* (VI-p. 349);); *Waterfowl* (VI-p. 358); *Neotropical Migratory Bird Guild* (VI-p. 362); *Tidal Brackish and Freshwater Marsh Habitat Plant Community Group* (VI-p. 371). **Harvested Species:** *Striped Bass* (VI-p. 395); *White Sturgeon* (VI-p. 401); *Non-native Warmwater Gamefish* (VI-p. 408); *Signal Crayfish* (VI-p. 414). **Stressors:** *Levees, Bridges, and Bank Protection* (VI-p. 435; Target 1, Programmatic Action 1A, VII-p. 110); *Dredging and Sediment Disposal* (VI-p. 441; Target 1, Programmatic Action 1A, p. 111).

Indicate the type of applicant (check only one box):

- ☑ State agency
- ☐ Public/Non-profit joint venture
- ☐ Local government/district
- ☐ University
- ☐ Federal agency
- ☐ Non-profit
- ☐ Private party
- ☐ Other: _____

Indicate the type of project (check only one box):

- ☐ Planning
- ☐ Monitoring
- ☐ Research
- ☑ Implementation
- ☐ Education

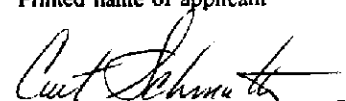
By signing below, the applicant declares the following:

1.) The truthfulness of all representation in their proposal;

2.) The individual signing the form is entitled to submit the application on behalf of the applicant (if the applicant is an entity or organization); and

3.) The person submitting the application has read and understood the conflict of interest and confidentiality discussion in the PSP (section 2.4) and waives any and all rights to privacy and confidentiality of the proposal on behalf of the applicant, to the extent as provided in the Section.

Curt Schmutte, Chief, Flood Protection and Geographic Information Branch
Printed name of applicant


Signature of applicant

Project Name: Venice Island Potato Slough Habitat Creation Demonstration Project

Primary Contact:

Name: Curt Schmutte, Chief Flood Protection and Geographic Information Branch

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Participants and collaborators: Reclamation District 2023 *(Co-applicant)*
FILDIN Development Company *(site owner)*
UC Student Farm *(field compost study)*
Sonoma Compost Company *(compost advisors)*
California Rice Industry Association *(advisors)*
Allan Garcia *(rice grower)*
LFR Levine·Fricke *(sediment rehandling)*
Kjeldsen, Sinnock, Nuedeck, Inc. *(civil engineer/surveying)*

Type of Organization and Tax Status: State Agency

Tax Identification Number and/or Contractor's License type and number: 68-0303606

PROJECT SIZE AND LOCATION. The Venice Island Potato Slough Habitat Creation Demonstration Project ("Venice Island Project"), will produce approximately 4 acres of habitat for sensitive native fishes in Potato Slough along the margins of Venice Island using a 7-acre agricultural property. Venice Island is located in San Joaquin County, California.

PRIMARY BIOLOGICAL/ECOLOGICAL OBJECTIVES. DWR is actively looking at various methods for reversing the effects of subsidence in the Western/Central Delta. This project is a key component to this mission of trying to restore Delta islands to tidal action. From an ecological perspective, it is essential for the Delta to contain tidal wetlands covering the full range of ecosystem gradients. To achieve this goal we simply must find a way to raise elevations in the deeply embedded Delta islands in order to restore them to normal tidal circulation. Consequently, the objectives of the Venice Island Project are to (a) develop cost-effective backfill mixtures to raise the elevations of deeply embedded Delta islands, (b) restore Delta Slough leveed lands to tidal action and floodflows, (c) restore Delta channel island shallow water and riparian habitat, (d) apply a beneficial reuse of an agricultural waste to reduce pollutants, and (e) demonstrate to the general public how conflicting priorities can be addressed through innovative ecological management and design in a public/private partnership.

The property owner, FILDEN Development Company (FDC), has agreed, for this project, to establish a conservation easement on a 7-acre parcel of land on Venice Island, which is owned by FDC (*see Letter of Intent*). DWR will use the site to demonstrate how to create new wetlands and midchannel island habitat from subsided leveed agricultural land. The project design involves building a new setback levee and achieving optimum elevations to restore rearing habitat for sensitive species of Delta fish using an innovative rice-straw/clean dredged sediment mixture to approximate natural marsh soils. The Venice Island Project habitat design includes grading the existing levee to create a midchannel island using existing nearby marshes as natural analogs during design and monitoring.

The Venice Island Project is designed to provide rearing habitat for a variety of threatened fish species, including delta smelt, longfin smelt, Sacramento splittail and chinook salmon. The created wetlands and riparian habitat will also benefit avian populations of native waterfowl, shorebirds, and California black rail. The Venice Island Project will also act to improve water quality by re-establishing natural marsh processes that remove contaminants in Delta waters.

COSTS AND THIRD PARTY IMPACTS. The Venice Island Project would develop an approach that could be implemented in a cost-effective manner for more expansive restoration of subsided agricultural lands and levee stabilization efforts in the Delta. Restoration projects that require large amounts of bulk material, such as dredged sediment and rice straw, generally experience higher costs for procurement, especially pilot-scale restoration projects, because commercial processing facilities for materials rehandling and composting are not yet available. Venice Island offers agricultural rice growers in the near vicinity an alternative to burning or flooding fields to dispose of rice straw, and some of the composted rice straw could be used as a soil amendment by the growers. However, those impacts would be considerably smaller than proposals involving large-scale flooding of Delta islands, and may be more readily supported by landowners.

APPLICANT QUALIFICATIONS. DWR and its Venice Island Project collaborators have been actively addressing restoration, land use, agriculture and water conservation, and related environmental issues in the Bay-Delta region for several decades. DWR has been involved in the habitat creation work at Twitchell Island, which also involves the evaluation of sediment reuse options. The Venice Island Project will provide additional data for use in the Twitchell Island project as well as other DWR wetland restoration projects. Since 1983, DWR's subconsultant on this effort, LFR, has been working in the region to solve difficult environmental problems. This experience includes working with leading experts to develop policies for sediment reuse in habitat restoration (the Long Term Monitoring Strategy [LTMS]) and projects that implement effective ecological restoration strategies (e.g., Montezuma Wetlands Restoration Project, Port of Oakland's Martin Luther King Jr. Wetlands Restoration Project, East Bay Regional Park District's Oro Loma Marsh Enhancement Project, Port of San Francisco's Pier 98 Open Space Enhancement Project).

MONITORING AND DATA EVALUATION. We have a programmatic approach to data management that will facilitate adaptive management by evaluating Venice Island's long-term benefits to priority species, effects on stressors, durability, and effects on water quality. In addition to our team experts, an independent technical review panel will evaluate monitoring results to recommend possible project adjustments, and we will coordinate our program with the Interagency Ecological Program (IEP) to allow regional Bay-Delta data comparison.

LOCAL SUPPORT / COORDINATION WITH PROGRAMS / COMPATIBILITY WITH CALFED OBJECTIVES. **Reclamation District 2023** is a co-applicant with DWR on this project. This ensures a high degree of local support and involvement from the public agency responsible for local stream bank alteration projects. **FILDIN Development Company**, a significant landowner in the area, has agreed to dedicate the project site as a conservation easement following construction. The **California Rice Industry Association** has supplied contacts with area rice growers. **Allan Garcia**, who organically farms 1,000 acres of rice, will make rice straw available for the project, along with others. The **U.C. Davis Student Experimental Farm** has agreed to allow the use of its staff and facilities for the field composting tests. Also, we will work with Mr. Garcia and **The Nature Conservancy** (TNC) early in the project to establish a larger-scale rice straw composting facility within TNC's Consumnes Preserve (Phase 2). Such a facility could also provide valuable "organic" soil amendments for rice growers within the Preserve, which would complement TNC's current efforts to transition its rice growing fields from conventional farming methods to organic methods. In addition, the LTMS is promoting beneficial reuse options for dredged sediment and the Venice Island Project offers opportunities to evaluate clean dredged sediment rehandling operations that may reduce salinity in sediments dredged from the more saline San Francisco Bay. We anticipate using the Montezuma Wetlands Project's rehandling facility to generate clean dredged sediment. Finally, the Venice Island Project creates fish habitat and restores island margins while maintaining existing land uses. These achievements support the goals of the CALFED program Category III funding efforts by restoring ecological health, improving existing water management structures, and addressing conflicts between the need to enhance fish habitat and maintain agriculture within the Delta.

PROJECT DESCRIPTION AND APPROACH. The Venice Island Project proposes to create approximately 4 acres of habitat for sensitive native fishes in Potato Slough along the margins of Venice Island (Figures 1 and 2) using a 7-acre agricultural property to be dedicated as a conservation easement by FILDIN Development Company upon project completion (*see Letter of Intent*). Existing flood protection levees will be relocated "inboard," the subsided agricultural lands between the former levee location and its new inboard location will be filled, a channel through the area will be created, and then the existing levee will be breached in upstream and downstream locations to return Delta waters and natural flow to the site (Figure 3). In conjunction with breaching the levee, the other areas of the outboard (or existing) levee will be graded down to create a midchannel island and revegetated with native riparian vegetation (e.g., willows and cottonwoods).

Because Venice Island has subsided to depths of 12 feet below mean lower low water, filling is required to achieve elevations appropriate to support both emergent and submergent vegetation critical to fish habitat creation (Figure 3). We propose to evaluate and develop combinations of rice straw (composted and uncomposted) and clean dredged sediment that can be used as fill material. We propose this combination because these materials are available in large quantities and the sediment/rice straw mixture may best approximate natural Delta peaty marsh soils. We will use field composting and laboratory studies to identify the combination of sediment and composted or uncomposted rice straw that most closely approximates natural peaty marsh soils while minimizing water quality impacts. We will use the results of the studies to determine the optimum mixtures for evaluation during the demonstration project.

In creating the channel through the restored habitat, we will use adjacent natural midchannel islands as analogs to design the surface and channel-bed elevations (Figures 3 and 4). We will design the channel and the levee breach to promote natural flow between Potato Slough and the created habitat, so that ambient main-channel temperatures are maintained within the created habitat, and fish entrapment does not occur. We will also create small backwater areas along the new channel to significantly increase habitat variability and habitat acreage because the vegetated channel edge is known to be prime habitat for the target native fishes[1].

SCOPE OF WORK. The full scope of work for the Venice Island Project consists of 11 technical tasks to be completed in three phases. This application is for Phase 1 tasks only, which addresses ecological design, preparation of plans and specifications, and permitting. Phase 2 addresses construction of the habitat, and Phase 3 addresses post-remediation monitoring. Phase 1 consists of Tasks 1, 2, and 3,which are "stand alone" tasks, and Tasks 4, 5, and 6, which are sequential and inseparable and can only be conducted on the basis of the results of Tasks 1, 2, and 3. Figure 5 provides a project flow chart of Phases 1A/1B and 2.

PHASE 1A: Ecological Design

Task 1: Site and Reference Site Characterization. We will evaluate existing biological, physical, and chemical conditions at the Venice Island site to determine baseline conditions (Figure 6). We will complete a 1:100 scale topographic survey of the site and at least one natural reference marsh, and a hydrographic survey of the adjacent slough bed elevations. We will perform a tidal reckoning analysis to determine the site-specific tidal datum and use those datum to establish the elevations appropriate to support target species and habitats. We will also collect key biological and hydraulic information at the site and the reference site, including flow velocity, stage height, current direction, and

[1] R. Baxter, California Department of Fish and Game. Personal communication, July 1997.

sedimentation rate, for use in project design. During this effort, we will evaluate aerial photographs of the area to assess erosion/accretion of existing Delta features. We propose to present the results of this task in the Final Ecological Report (*see Task 4*).

Task 2: Field Composting Study. We will conduct field composting studies to develop optimum composting procedures for turning rice straw into the most "peat-like" material (Figure 7). To effectively mimic large-scale composting operations, we will conduct the test using 100 cubic yards of rice straw formed into windrows about 5 feet high. Because we need to reduce the high carbon/nitrogen ratio of the rice straw (~100:1), we will divide the windrow into sections of equal volume to test several treatment options, including nitrogen-enriched food processing wastes (from canneries and/or breweries), agricultural manures, commercial NPK fertilizer, and microbial inoculants/enzymes (from rice field soil and/or commercial sources). We will conduct the tests at the U.C. Davis Student Experimental Farm under the guidance of Sonoma Composting Company (SCC), using techniques currently employed at SCC's 50,000 cubic yards per year commercial facility. In addition to evaluating the "finished" condition of the compost using standard parameters of temperature, soluble nutrients, bulk density, and visual conditions, we will leach the compost with a dilute alkaline solution (commonly used in soil chemical extractions) to assess the "availability" (i.e., stability) of organic carbon in the composted rice straw. We will present the results of this task in the Final Ecological Report (*see Task 4*).

Task 3: Laboratory Water Quality Study. We will conduct laboratory "leaching" tests to evaluate the potential for rice straw/sediment mixtures to affect water quality compared to three peat soil samples from natural marshes near the Venice Island site. While the best measures of water quality impacts will be obtained from monitoring the Venice Island Project under real hydraulic conditions (*Phase 3*), these laboratory tests will allow us to conservatively assess potential impacts to water quality and to design optimum combinations of rice straw (composted or uncomposted) and clean dredged sediment for testing in the Venice Island Project. We will test combinations of composted and uncomposted rice straw and clean dredged sediment in batch leaching tests. We will analyze the water for the water quality parameters listed in Table 1. Based on the results of those batch leaching tests, we will further evaluate the four combinations that produce minimum water quality impacts using a "tidal simulation" (TS) test (developed by USACE Waterways Experiment Station[2]). The TS test reproduces tidal action by pumping water from the test system (aquarium) and by gravity feeding water into the system at set time intervals to mimic the natural schedule of the tides. We will also evaluate geotechnical properties. We propose to present the results of this task in the Final Ecological Report (*see Task 4*).

Task 4: Final Ecological Design Report. We will summarize the ecological and engineering design in a Final Ecological Design report. The report will include detailed cost estimates, preliminary design specifications, a construction schedule, and a draft monitoring plan. We anticipate finalizing this draft monitoring plan during the permitting process in Phase 1B.

We have prepared a conceptual engineering design for the demonstration project. Descriptions and associated costs for the pre-construction engineering and ecological design elements of the

[2] Simmers, J.W., R.G. Rhett, S.H. Kay, and B.L. Folsom, Jr. 1989. Synthesis of the results of the field verification program wetland disposal alternative. U.S. Army Corps of Engineers, Waterways Experiment Station, Vicksburg, MS. Tech. Rep. D-89-2.

demonstration project are provided in Table 2. Figures 8 and 9 shows a cross-section and a plan view, respectively, of the Venice Island Project.

PHASE 1B: Preparation of Plans & Specifications and Permitting

Task 5: Construction Plans and Specifications. We will prepare construction-ready plans and specifications, including materials suitable for bidding the project. DWR will solicit bids for construction and will use the lowest qualified bids as basis for securing funding for Phase 2 construction. DWR's subconsultant, LFR, has evaluated earthwork quantities using specific materials and sources; construction methods and equipment; costs; and schedule. Those evaluations and the associated costs are presented in Table 2; these are preliminary engineering cost estimates (± 35%).

Task 6: Permitting. The DWR Team will obtain necessary permits (Table 3). Deliverables for this task include permit applications and supporting documentation needed to obtain the permits. The draft monitoring plan will be finalized during consultation with the resource and permitting agencies.

PHASES 2 and 3: Construction of Habitat Restoration and Post Restoration Monitoring

With future funding, the DWR team will oversee construction, construction management, biological monitoring, water quality monitoring, and geotechnical and physical monitoring. The biological monitoring will focus on factors such as fish presence, abundance and composition, vegetation, and invertebrate support. We will apply an adaptive approach to allow us to modify management of the restored site to maximize enduring restoration efforts. To evaluate water quality in the newly created habitat, we will collect surface water and subsurface water samples by installing hydropunch probes at different locations and elevations to evaluate the interaction of sediment/rice mixtures with the Delta waters. We will analyze the samples for the water quality parameters listed in Table 1. We will monitor the physical properties of the created habitat to assess sedimentation, levee stabilization, and hydraulics. We will conduct quarterly sampling and report results to the Technical Review Panel and CALFED on an annual basis for five years.

LOCATION OF PROJECT. The project is located in San Joaquin County in the Sacramento-San Joaquin Delta watershed, along Potato Slough on Venice Island (*see USGS map*). We will conduct the composting field tests at the Student Experimental Farm at U.C. Davis, Davis, California, and the laboratory suitability studies in LFR's laboratory in Emeryville, California. We will work with Allan Garcia and the Nature Conservancy to establish a rice straw composting facility within the Conservancy's Consumnes Preserve. Clean dredged sediment will be rehandled at the Montezuma Wetlands Restoration Project facilities.

ECOLOGICAL/BIOLOGICAL BENEFITS. This project is a key component of the DWR mission to restore Delta islands to tidal action and provide wetlands covering the full range of ecosystem gradients. A way must be found to raise elevations in the deeply embedded Delta islands in order to restore them to normal tidal circulation. The objectives of this Project are to (a) develop cost-effective backfill mixtures to raise island elevations, (b) restore leveed lands to tidal action and floodflows, (c) restore channel island, shallow water and riparian habitats, (d) apply a beneficial reuse of agricultural waste to reduce pollutants, and (e) demonstrate to the general public how conflicting priorities can be addressed through innovative ecological management and design in a public/private partnership.

The Venice Island Project is designed to provide critical habitat (i.e., spawning and/or rearing) for a variety of threatened fish species, including delta smelt, longfin smelt, and Sacramento splittail. The created wetlands will also benefit avian populations of native waterfowl, shorebirds, and California black rail. The Venice Island Project will contribute to improved water quality by re-establishing natural marsh processes that remove contaminants in Delta Waters.

The Venice Island Project establishes tidal elevations in island margins without "filling in" existing Delta waterways, as might be the case with other projects that do not combine levee modifications and limited farmland reclamation. Thus, by restoring habitat along the margins of a subsided Delta island, the Venice Island Project will demonstrate how to achieve maximum restoration benefits through effective co-existence with agricultural land use interests and necessary flood control measures. The methods used in the Venice Island Project will be adaptable to other sites throughout the region to aid in the long-term recovery of fish habitat. By using the rice straw—an agricultural by-product that is primarily disposed of by burning (which is undergoing increasing regulatory restrictions) or flooding harvested fields (which affects fresh water supplies for sensitive fish and urban users)—the Venice Island Project will reduce effects to air quality associated with burning rice straw, preserve water supplies, and provide the "recipe" for a cost-effective backfill that can be used throughout the Delta to create wetlands habitat and suitable spawning/rearing habitat for threatened Delta fishes. Under an effective public relations program, all of these benefits can be communicated to the general public to demonstrate how a public/private partnership and forward thinking ecological management can be applied to address the conflicting priorities present in the Delta region.

Stressors. Venice Island is designed to address floodplain and marshplain changes, channel form changes, water quality, undesirable species interactions, and land use.

Species. Venice Island focuses on juvenile delta smelt *(Hypomesus transpacificus)*, longfin smelt *(Spirinchus thaleichthys)*, Sacramento splittail *(Pogonichthys macrolepidotus)*, and fall-run chinook salmon juveniles *(Oncorhynchus tshawytscha)* outmigrating from the San Joaquin and Mokelumne rivers, among other sources[1]. Outmigrating salmonids (primarily fry and some smolts) spend several months in shallow rearing habitat in the Delta, and have recently been documented in the San Joaquin River close to Potato Slough[2]. Delta smelt and long-fin smelt have been documented in the San Joaquin River[3]. Sacramento splittail have been documented in the San Joaquin River, where spawning is likely to occur in reaches with shallow emergent vegetation[4].

Ecosystem Benefits. Venice Island will create approximately 4 acres of spawning and rearing habitat for the target species identified above. Given the project's location relative to the San Joaquin and Mokelumne rivers and the primary water diversion pumps (e.g., CVP, SWP), Venice Island will provide what may be the final fish habitat opportunity in this reach of the Bay-Delta system[5]. In addition, upon completion, Venice Island will address these identified stressors:

- *Floodplain and Marshplain Changes.* Levee construction throughout the Delta islands has physically isolated water sources from their natural flood and marshplains. Venice Island will re-establish marshplain in lands currently supporting agriculture, thereby addressing hydrologic and physical isolation of floodplain and marshplain, and increasing floodplain and flood storage capacity.
- *Channel Form Changes.* Venice Island will re-establish channel hydrogeomorphology and restore natural physical processes, including natural inundation cycles. Using nearby natural analogs to create the midchannel island and tidal perennial habitat, Venice Island will increase emergent and submergent vegetation and riparian habitat along two perimeter levees. Venice Island will demonstrate the viability of using set-back levees and habitat creation to increase channel meander and reduce pressure on levees.
- *Water Quality.* Because wetlands filter water[6], Venice Island wetlands should enhance reduction of contaminant concentrations in Potato Slough.
- *Undesirable Species Interactions.* To enhance native species survival, we will implement eradication or control options for exotic species during Phase 3 monitoring.
- *Land Use.* Venice Island will employ a conservation easement to change land use in perpetuity.

Expected secondary benefits include the creation of shallow water foraging habitat for shorebirds and waterfowl, and wetland and upland foraging and rearing habitat for native waterfowl and Swainson's hawks, which have been recently documented in the area[7].

Third Party Benefits. Venice Island will evaluate a beneficial reuse alternative for rice growers who now rely primarily on burning or flooding fields to dispose of rice straw. Venice Island will also provide research data on composting processes that produce the most stable rice straw compost. Venice Island will also evaluate the beneficial reuse of clean dredged sediment and rehandling sediment from the more saline San Francisco Bay.

Benefits to Other Ecosystem Restoration Programs. Venice Island will evaluate and develop clean dredged sediment/rice straw mixtures that can be used effectively as fill material to create wetland habitat throughout much of the Bay-Delta system. This effort reduces effects to air quality associated with burning rice straw and relieves ongoing pressure to dispose of dredged sediment in San Francisco Bay or the ocean. In addition, this project addresses one of the objectives of the Anadromous Fish Restoration Program by providing juvenile fish rearing habitat in the Delta[8].

BENEFITS TO CALFED NON-ECOSYSTEM OBJECTIVES. Existing Delta levees could fail during a large seismic event. Current methods for levee stabilization are expensive, and by working in aquatic areas, may be damaging to existing biota. Venice Island will evaluate using fill placement (for wetland creation) in non-wetlands area to bolster levees, thus reducing hydrostatic pressure and wave-generated erosion.

LINKAGES, SYSTEM-WIDE BENEFITS. Native fish populations in the Bay-Delta are rapidly declining because of habitat alterations that have dramatically reduced critical spawning and rearing habitat for special status species, such as the delta smelt and Sacramento splittail[9]. Many habitat alterations occurred during flood control levee construction that created islands to accommodate other land uses, primarily agriculture (Figure 4). Although flooding of Delta islands would restore natural processes to the area, the value of agricultural products from the region makes this option impractical. Therefore, it is important to develop wetlands restoration designs that can provide valuable habitat along island margins, while still supporting other land uses.

As described previously, Venice Island involves moving the existing levee inboard, raising land between the current levee location and its new inboard location and constructing a channel to establish the fish and wetland habitat, and then breaching the levee to restore tidal action to the restoration area. Moving the levee inboard reclaims a limited area of farmland to create valuable tidal perennial aquatic and midchannel island habitats, preserves agricultural land uses, and creates a levee setback that relieves pressure on the levee and increases the floodplain. The planned restoration area establishes appropriate elevations for prime Delta fish spawning and rearing habitat without "filling in" existing Delta waterways, as might be the case with other projects that do not involve reclamation of diked islands. We have proposed a rice straw/clean dredged sediment mixture as fill material to (a) develop a new material suitable for this and other restoration efforts, (b) research the use and effect of organic materials in aquatic habitat restoration, (c) develop optimum processes for producing the most natural peat-like material, and (d) establish an alternative to rice straw burning for area rice growers. Increasing the acreage of prime habitat by creating small backwater areas along the channel through the restoration area maximizes potential benefits of the project design without affecting levee stability or land uses in other areas of the island (see Figures 3 and 4). Grading and revegetating the outer levee with riparian plant species creates a more complex ecosystem, again maximizing restoration efforts. Thus, Venice Island offers the opportunity for enduring habitat restoration to co-exist with current land uses.

We believe that Potato Slough is an ideal location for a fish restoration project because the slough connects the Mokelumne and San Joaquin rivers, areas known to support spawning and rearing delta smelt, longfin smelt and Sacramento splittail. We believe that creating appropriate habitat in Potato Slough will attract the target fish populations because habitat in those rivers is limited. We believe the fish populations can be maintained in this area because Venice Island's design is based on natural nearby marshes, with the added benefit of fill materials that will approximate peaty soils so that an enduring habitat will be achieved.

ERPP Objectives. This proposal meets the following ERPP objectives (from Vol 1):

ECOSYSTEM PROCESSES:
- natural floodplains (p. 83)
- delta channel hydraulics (p. 91)
- Bay-Delta aquatic food-web (p. 95)

HABITATS:
- tidal perrenial aquatic habitat (p. 111)
- delta sloughs (p. 120)
- mid-channel islands (p. 125)
- fresh emergent vegetation (p.136)
- freshwater fish habitats (p. 155)
- essential fish habitats (p. 160)

STRESSORS:
- levees (p. 435)
- dredging and sediment disposal (p. 441)

SPECIES: (Priority Group I)
- delta smelt (p. 191)
- longfin smelt (p. 196)
- green sturgeon (p. 203)
- splittail (p.207)
- chinook salmon (p. 211)
- steelhead trout (p. 225)
- three Priority Group II species
- two Priority Group III species
- six Priority Group VI species
- five harvested species

[1] U.S. Fish & Wildlife Service (USFWS). 1997. *Abundance and Survivial of Juvenile Chinook Salmon in the Sacramento-San Joaquin Estuary, 1994 Annual Progress Report.* April 1997; USFWS. 1995. *Volume III: Working Paper on Restoration Needs.* "Habitat Restoration Actions to Double the Natural Productions of Anadromous Fish in the Central Valley California."; L. Meng and D.B. Moyle. 1995. *Status of Splittail in the Sacramento-San Joaquin Estuary.* Transactions of the American Fisheries Society. 124:538-549; L. Meng. Personal communication, July 1997; P.B. Moyle, B. Herbold, D.E. Stevens, and L.W. Miller. 1992. *Life history and status of the delta smelt in the Sacramento-San Joaquin estuary, California.* Transactions of the American Fisheries Society 121: 67-77; B. Herbold. Personal

communication, July 1997; San Francisco Estuary Project. 1992. *Status and trends report on the aquatic resources in the San Francisco Estuary*. Prepared under cooperative agreement #CE009519-01-1 with the Environmental Protection Agency

2 U.S. Fish & Wildlife Service (USFWS). 1997. *Abundance and Survivial of Juvenile Chinook Salmon in the Sacramento-San Joaquin Estuary: 1994 Annual Progress Report*. April 1997

3 B. Herbold, Personal communication, 1997. U.S. Fish and Wildlife Collection Data. 1996.

4 L. Meng. Personal communication, June 1997.

5 R. Baxter, California Department of Fish and Game. Personal communication, July 1997

6 W.J. Mitsch and J G. Gosselink 1993. *Wetlands*. 2nd Edition. Van Nostrand Reinhold, New York City, New York.

7 S.K. Herzog. 1996. "Wintering Swainson's Hawks in California's Sacramento-San Joquain Delta." *The Condor*. 98:876-879.

8 U.S. Fish and Wildlife Service. 1995. *Habitat Restoration Actions to Double Natural Production of Anadromous Fish in the Central Valley of California*, prepared in cooperation with the Anadromous Fish Restoration Program Core Group. May 9.

9 Moyle P.B., B. Herbold, D.E. Stevens, and L.W. Miller. 1992. *Life history and status of the delta smelt in the Sacramento-San Joaquin estuary, California*. Transactions of the American Fisheries Society 121: 67-77; L. Meng and D.B. Moyle. 1995. *Status of Splittail in the Sacramento-San Joaquin Estuary*. Transactions of the American Fisheries Society. 124:538-549; L. Meng. Personal communication, July 1997

TECHNICAL FEASIBILITY AND TIMING

DWR will ensure that the Venice Island Project complies with all applicable laws and regulations. Table 3 shows the environmental document needs and potential permit actions associated with full implementation of the project plan. The field study composting activities at the UC Davis Student Experimental Farm do not require permits.

Consent of the Venice Island site owner to allow use of the site for the demonstration project and creation of a conservation easement upon project completion has already been obtained. With the assistance of Allan Garcia and The Nature Conservancy, the project team has already identified a source for the rice straw materials and a location for conducting the full-scale composting operation.

Preliminary design and costing efforts have already been completed. The restoration design has been reviewed and favorably received by authorities on Delta fish ecology and habitat restoration. The local reclamation district is a co-applicant of this proposal; in addition, dialog has been initiated with the myriad of interested parties in the Delta, and further community outreach will be conducted as the project progresses to address the needs of the local community.

MONITORING AND DATA EVALUATION. Monitoring is proposed during the final phase (Phase 3) of this project to determine the effectiveness of the habitat restoration actions and for adaptive management of the site as the wetland/riparian channel island communities develop. Complete specification of the monitoring program will be determined in coordination with the technical review panel (see below) and cooperating resource agencies. That program will identify the monitoring data to be collected, the evaluation approach, data management protocols, and the frequency, content, and format of reports. All monitoring will be coordinated, when possible, with ongoing monitoring programs. For example, all data collection efforts and results concerning the ecological response of the site to habitat restoration will be coordinated with the Interagency Ecological Program. This will enable regional comparisons for implementing adaptive management strategies at the pilot project site. Monitoring data will be incorporated into a GIS database system that can be integrated into other ongoing (and future) monitoring efforts in the Bay-Delta. In addition, the Venice Island Project will provide valuable data on beneficial reuse options for clean dredged sediment and organic materials, specifically rice straw. The project will also assess limited reclamation of farmlands and the filling of that land to achieve appropriate elevations for habitat restoration. Finally, the Venice Island Project will provide data concerning the effectiveness of alternatives for increasing floodplains in the region and levee stabilization methods. The project database will be structured to allow efficient data recovery and analysis, quality assurance/quality control, plotting, graphing, tabulation, and calculation.

In consultation with CALFED, we will assemble a technical review panel of recognized experts, agency personnel, and local interested parties to evaluate project progress and conduct independent third-party review of project deliverables. As appropriate, the review panel will recommend modifications to the project to assist in fine tuning the management strategy, to maximize the potential for success in the long-term, both for the project, and similar projects in the future.

Biological/Ecological Objectives			
Hypothesis/Question to be Evaluated	Monitoring Parameter(s) and Data Collection Approach	Data Evaluation Approach	Comments/Data Priority
Are the biotic communities developing as expected.	Five year sampling. At least seasonal in frequency. Use methods for vegetation, benthos, fish,birds, amphibians	Data to be evaluated against reference/ target sites to ensure proper restoration of native communities.	Results to be used to guide adaptive management of the site.
Have the restoration activities positively affected site water quality.	See Table 1 for water quality analytes and methods.	Compare WQ data with pre-restoration baseline and reference site.	This will allow evaluation of organic soil formation, and nutrient processing.
Is sedimentation, levee stablility, hydraulics as expected	Monitor geotechnical /physical habitat properties.	Compare with baseline and reference sites.	Allows determination of habitat and structural stability.

LOCAL INVOLVEMENT

County Notification. Attached is a letter from DWR to the County Supervisors of San Joaquin county informing them of the proposed project and this submittal to CALFED for funding.

Adjacent Landowners. The adjacent landowner is Venice Island, Inc. They will not be affected by the proposed project.

Local Support. The local reclamation district (2023) is a co-applicant on this proposal and supports the project (see attached letter). This involvement ensures local participation by those elected officials who are recognized in and empowered by the community as decision makers.

Public Outreach Plan. Public outreach varies with the phases of the project. In the first phase (Project Design) the public will be informed of the results of the studies by presentation of the Final Ecological Design Report at professional seminars, Interagency Ecological Program conferences, and notification of its availability in local newspapers. Phase I also includes an Initial Study and Environmental Assessment. The results of these studies/assessments will be made available to the public through the CEQA/NEPA public notification process. In Phase 2 (construction) and Phase 3 (post-construction monitoring) the public will be informed of progress on the project through newsletters to a stakeholder mailing list developed in conjunction with the CEQA/NEPA documentation. Since Reclamation District 2023 is a co-applicant, the District will be informed monthly of the projects progress and milestone accomplishments. The project team will present results of the studies and progress at public meetings convened by the Local Reclamation District upon request.

Permission of Property Owner. The Venice Island project has the permission of the property owner (see attached letter). At completion of the project, the project site will be designated as a conservation easement.

Third-Party Impacts. We do not anticipate significant third-party impacts associated with this demonstration project.

STATE OF CALIFORNIA - THE RESOURCES AGENCY GRAY DAVIS, *Governor*

DEPARTMENT OF WATER RESOURCES
CENTRAL DISTRICT
3251 S STREET
SACRAMENTO, CA 95816-7017

Mr. Robert J. Cabral, Chairman
San Joaquin County Board of Supervisors
222 E. Weber Avenue, Room 701
Stockton, California 95202

Dear Mr. Cabral:

The California Department of Water Resources' Flood Protection and Geographic Information Branch has joined with Reclamation District 2023 to submit (as co-applicants) a proposal to CALFED for funding of the Venice Island Potato Slough Habitat Creation Demonstration project. We want San Joaquin County to understand the following concerning this project:

- The demonstration project will produce approximately four acres of habitat for sensitive native fishes in Potato Slough along the northern margins of Venice Island using seven acres of agricultural land donated by the property owner.

- The project will relocate the existing flood protection levee "inboard," fill the subsided agricultural lands between the former levee location and its new inboard location, create a channel through the area, and then breach the existing levee in upstream and downstream locations to return Delta waters and natural flow to the site. In conjunction with breaching the levee, the other areas of the outboard (or existing) levee will be graded down to create a mid-channel island, and revegetated with riparian vegetation (e.g., willows and cottonwoods).

DWR will keep you informed of the status of this proposal, and should it be funded, the progress of the project. If you have any questions regarding our proposal, please call me at (916) 227-7567.

Sincerely,

Curt Schmutte, Chief
Flood Protection and Geographic
Information Branch

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STATE OF CALIFORNIA - THE RESOURCES AGENCY GRAY DAVIS, *Governor*

DEPARTMENT OF WATER RESOURCES
CENTRAL DISTRICT
3251 S STREET
SACRAMENTO, CA 95816-7017

Ms. Margit Aramburu
Executive Director
Delta Protection Commission
14215 River Road
Walnut Grove, California 95690

Dear Ms. Aramburu:

The California Department of Water Resources' Flood Protection and Geographic Information Branch has joined with Reclamation District 2023 to submit (as co-applicants) a proposal to CALFED for funding of the Venice Island Potato Slough Habitat Creation Demonstration project. We want San Joaquin County to understand the following concerning this project:

- The demonstration project will produce approximately four acres of habitat for sensitive native fishes in Potato Slough along the northern margins of Venice Island using seven acres of agricultural land donated by the property owner.

- The project will relocate the existing flood protection levee "inboard," fill the subsided agricultural lands between the former levee location and its new inboard location, create a channel through the area, and then breach the existing levee in upstream and downstream locations to return Delta waters and natural flow to the site. In conjunction with breaching the levee, the other areas of the outboard (or existing) levee will be graded down to create a mid-channel island, and revegetated with riparian vegetation (e.g., willows and cottonwoods).

DWR will keep you informed of the status of this proposal, and should it be funded, the progress of the project. If you have any questions regarding our proposal, please call me at (916) 227-7567.

Sincerely,

Curt Schmutte, Chief
Flood Protection and Geographic
Information Branch

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RECLAMATION DISTRICT 2023
Venice Island, California
3031 W. March Lane, Suite 224W
Stockton, California 95219-6561
Telephone (209) 478-1957
Facsimile (209) 478-8426

April 9, 1999

Curt Schmutte, Chief Flood Protection and Geographic Information Branch
California Department of Water Resources
3251 "S" Street
Sacramento, California 95816

Subject: Venice Island Potato Slough Habitat Creation Demonstration Project

Dear Curt:

This letter acknowledges that the Venice Island Reclamation District 2023 ("the District") is a co-applicant with the California Department of Water Resources in implementing the Venice Island Potato Slough Habitat Creation Demonstration Project. The District understands that:

- The demonstration project will produce approximately 4 acres of habitat for sensitive native fishes in Potato Slough along the margins of Vince Island using a 7-acre agricultural property.
- That the project will relocate the existing flood protection levee "inboard," fill the subsided agricultural lands between the former levee location and its new inboard location, create a channel through the area, and then breach the existing levee in upstream and downstream locations to return Delta waters and natural flow to the site. In conjunction with breaching the levee, the other areas of the outboard (or existing) levee will be graded down to create a mid-channel island, and revegetated with riparian vegetation (e.g., willows and cottonwoods).
- That the project will resolve conflicts between reductions in fish habitat and existing agricultural uses of Delta islands, develop cost-effective backfill mixtures for habitat restoration, apply a beneficial reuse to an agricultural waste to reduce pollutants, and demonstrate to the general public how conflicting priorities can be addressed through forward thinking ecological management and design in a public/private partnership.

The District welcomes this opportunity to work with you and look forward to a successful project.

Sincerely,

by John McCarty, Jr. Associate

the McCARTY Company, manager
Reclamation District 2023

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J. PHILIP DINAPOLI

April 14, 1999

Curt Schmutte
Chief Flood Protection and Geographic Information Branch
California Department of Water Resources
3251 "S" Street
Sacramento, CA 95816

Subject: Venice Island Potato Slough Habitat Creation Demonstration Project

Dear Mr. Schmutte:

This letter serves to notify the California Department of Water Resources of Fildin Development Company's support of the Venice Island Potato Slough Habitat Creation Demonstration Project. Fildin understands that the demonstration project will produce approximately 4 acres of habitat for sensitive native fishes in Potato Slough along the margins of Venice Island using a 7-acre agricultural property currently owned by Fildin Development.

We further understand that the project will relocate the existing flood protection levee "inboard," fill the subsided agricultural lands between the former levee location and its new inboard location, create a channel through the area, and then breach the existing levee in upstream and downstream locations to return Delta waters and natural flow to the site. In conjunction with breaching the levee, the other areas of the outboard (or existing) levee will be graded down to create a mid-channel island, and revegetated with riparian vegetation (e.g., willows and cottonwoods). We understand that the project will solve conflicts between reductions in fish habitat and existing agricultural uses of Delta islands, develop cost-effective backfill mixtures for habitat restoration, apply a beneficial reuse to an agricultural waste to reduce pollutants, and demonstrate to the general public how conflicting priorities can be addressed through innovative ecological management and design in a public/private partnership.

In supporting this effort, Fildin Development will be responsible for the following items:

- Granting, under a perpetual conservation easement, development rights for the approximate 7-acre project site onto which a portion of Potato Slough will be realigned

99 ALMADEN BOULEVARD, SUITE 565, SAN JOSE, CALIFORNIA 95113 • (408) 998-2460 • FAX (408) 998-2404

I-016131

- Granting access rights to the designated project area during the demonstration project design, implementation, and monitoring phases

- Providing a designated staging area, as required, during the demonstration project implementation (Phase II-Construction)

The commitment evidenced by this letter is valid throughout the bid period for the CALFED Bay-Delta Program's February 1999 Proposal Solicitation for Ecosystem Restoration Projects and Programs.

Sincerely,

J. Philip DiNapoli, General Partner
Fildin Development Company

Costs. We have developed our project to allow incremental funding in three phases over the course of two years, with a minimum five-year monitoring period.

Phase & Task Description	Direct Labor Hours	Direct Salary & Benefits		Overhead Labor (General Admin & fee)		Fully Burdened Rates	Service Contracts	Material & Acquisition Contracts	Miscellaneous & Other Direct Costs	Total
		Hrly Rate	*Total $$$*	*Hrly Rate*	*Total $$$*					
Phase 1A Ecological Design										
1. Site Characterization	418	35.18	14,703	59.32	24,796	94.50			8,000	$ 47,499
2. Field Composting Study	162	42.36	6,862	57.39	9,298	99.75			12,000	28,160
3. Laboratory Water Quality Study	156	35.95	5,608	50.62	7,897	86.57			22,100	35,605
4. Final Ecological Design Report	1,500	34.43	51,644	46.58	69,867	81.01			2,500	124,011
Project Management (LFR)	112	43.37	4,857	58.76	6,581	102.13			750	12,188
Project Administration (RD 2023)										23,528
									Phase 1A Total	**$270,991**
Phase 1B Plans & Specs/Permitting										
5. Construction Plans & Specifications	1,660	35.27	58,547	53.24	88,370	88.51				$ 146,917
6. Permitting	485	33.37	16,184	44.59	21,628	77.96			5,000	42,812
Project Management (LFR)	108	43.37	4,684	58.76	6,346	102.13			500	11,530
Project Administration (RD 2023)										18,973
									Phase 1B Total	**$ 220,232**

Preliminary cost estimates for Phase 2 (construction) and Phase 3 (post construction monitoring) are $1.9 million and $110,00 respectively.

Schedule. We must conduct portions of the work during specific seasons (e.g., when fish spawn; when tidal elevations are relatively low). As a result, we anticipate that the schedule of work, excluding monitoring, will extend over a period of approximately two years (Figure 10). Therefore, we anticipate negotiating funding to occur in harmony with that schedule, allowing sufficient lead time to complete contractual arrangements and effectively mobilize specific project phases. More specifically, the tasks in Phase 1A/1B if scheduled for completion, would require funding in toto within a 19-month period beginning no later than December 1999. If this funding milestone was met, then Phase 2 could begin (contingent upon additional funding) in July 2001 and continue until October 2001. Phase 3 could begin (contingent upon additional funding) in November 2001 and continue for a five-year period. We anticipate providing CALFED with monthly invoices documenting work activities and expenditures.

TASK	Oct-Dec 1999	Jan-Mar 2000	Apr-Jun 2000	Jul-Sep 2000	Oct-Dec 2000	Jan-Mar 2001	Apr-Jun 2001	Total Budget
Phase 1A:								
1. Site Characterization	7,916	23,750	15,833					47,499
2. Field Composting			14,080	14,080				28,160
3. Laboratory WQ Study				8,901	26,704			35,605
4. Final Eco. Design Report				24,802	74,407	24,802		124,011
Project Management	2,552	7,653	7,653	7,653	7,653	2,552		35,716
Phase 1A Totals by Quarter	10,468	31,403	37,566	55,436	108,764	27,354		**270,991**
Phase 1B:								
5. Construction Plans & Specs						73,459	73,459	146,917
6. Permitting					10,702	16,055	16,055	42,812
Project Management					7,625	11,439	11,439	30,503
Phase 1B Totals by Quarter					18,327	100,953	100,953	**220,232**
Grand Totals by Quarter	10,467	31,403	37,566	55,436	127,092	128,307	100,953	491,223

COST SHARING

In requesting funding for Phase IA/IB, we note the following funding commitments:

- Based on legislative appropriations, the SB 34/AB 360 Delta Levee Program intends to commit at least $500,000 to fund construction of the project (Phase 2 and Phase 3). In addition, DWR is providing project management for Phase 1 of the project at no cost to CALFED; this service has an estimated value of $50,000.
- The property owner is contributing the land at no cost to the project through FILDIN Development Company. This contribution is valued at $50,000.
- Coordination by the project team with The Nature Conservancy, and local rice growers to gain support and promote local involvement in the project is provided at no cost, with an estimated total value of $25,000, although efforts will vary during the course of the project.
- All field equipment will be provided at no cost to the project. Additionally, all travel and subsistence costs also are being contributed. Together, these costs are valued at approximately $35,000.
- Proposed subcontractor labor rates are calculated at cost, which represents an approximate average discount of 20% off standard commercial rates. Based on the projected level of effort, the total value of this discount is approximately $100,0000.

PLANNED ORGANIZATION, STAFF & RESOURCES. Figure 11 provides an organization chart for the DWR team. As shown, the DWR-Rec. District 2023/FDC/LFR Team blends ecology and engineering with experience working in the Bay-Delta region. Team members have completed some of the largest and most complex restoration efforts in the Bay-Delta region, successfully restoring dynamic ecosystems (*see bio sketches and Table 4*). In addition to the resources identified in the organization chart and listed in Table 4, LFR employees over 500 professionals with experience in all phases of environmental resource management, regulatory negotiation, and environmental remediation. The project team can draw upon this multi-disciplinary breadth of expertise as necessary to comprehensively address project issues or related matters.

TECHNICAL, ADMINISTRATIVE, AND PROJECT MANAGEMENT. Curt Schmutte, DWR, will act as project manager and be the primary contact with CALFED. He managed more than $50 million of Delta flood control as well as habitat development projects, including Grizzly Slough, Decker Island Phase I, Sherman Island Berm Category III, Twitchell Island levee set-back, and Lower Sacramento River Revegetation. Additionally, he was formerly the program manager of the Levee System integrity component of CALFED. Mr. Schmutte will be coordinating with Douglas S. Lipton, Ph.D., Edward F. Cheslak, Ph.D., and Roger D. Leventhal, P.E., to obtain multidisciplinary technical leadership in wetlands restoration, aquatic ecology, and engineering aspects of the project, respectively. Dr. Cheslak will serve as the LFR Project Manager to provide Mr. Schmutte with a single point of contact with the LFR team of technical specialists.

DWR will be the contracting authority for this project and will be ultimately responsible for payments, reporting and accounting. The partnership of DWR with Reclamation District 2023 *(see Letters of Intent)* is intended to provide local control over this Levee modification projects. All work products will be jointly reviewed and signed-off by designated representatives of each co-applicant. LFR Levine-Fricke, who will contract with Reclamation District 2023, has been selected as the subcontractor due to LFR's extensive experience in wetland restoration, levee set backs, and innovative fill methodologies.

BIO SKETCHES/QUALIFICATIONS/EXPERIENCE/PAST PERFORMANCE

Douglas S. Lipton, *Ph.D. Soil Chemistry, 1991; M.S. Soil Science, 1983; B.A. Environmental Biology, 1980; B.A. Molecular Biology, 1980.* Dr. Lipton directed some of the largest ecological restoration projects in the Bay-Delta region, including the 2,000-acre Montezuma Wetlands Restoration Project and the recently completed Oro Loma Marsh Enhancement Project, which has been called a "model" restoration by the San Francisco Joint Bay Venture. His past project experience also includes directing the Port of Oakland's Martin Luther King Jr. Wetlands Restoration Project, managing the revegetation and closure of a Superfund site in California's Central Valley, and directing research at a facility dedicated to dredging and composting agricultural wastes.

Edward F. Cheslak, *Ph.D. Aquatic Ecology, 1982; M.S. Ecology, 1976; B.S. Zoology, 1971.* Dr. Cheslak has more than 26 years of experience in conducting, directing, analyzing, and evaluating applied ecological studies, experiments and environmental assessments in streams, lakes, estuaries, riparian corridors, and wetland ecosystems. This includes analysis of the effects of nonpoint discharges, flow modifications, and habitat enhancement on stream water quality, fisheries, aquatic invertebrates, and riparian communities. He also has over 15 years of experience in managing multidisciplinary teams conducting environmental studies, ecological assessments, and habitat restoration.

Roger D. Leventhal, P.E. *(California, 42467), M.S. Civil Engineering, Hydraulics and Water Resources, 1985; B.A. Geology (Geochemistry Emphasis), 1983.* Mr. Leventhal has unique experience in ecological restoration/environmental engineering projects. He was the lead engineer for LFR's major wetlands and shoreline restoration projects in the Bay Area and Sacramento River Delta. His background in hydraulics/water resources and practical experience in applied engineering principles have contributed to numerous successes in the environmental field. He has evaluated design alternatives, successfully negotiated permitting, prepared plans and specifications and supervised field construction of some of the largest and most successful restoration projects on the West Coast. Mr. Leventhal brings extensive expertise in analysis and design of tidal channels, and in tidal reckoning analysis to the project.

NATURE AND EXTENT OF COLLABORATING PARTICIPANTS

Kjeldsen, Sinnock, Neudeck, Inc. (KSN) will assist with final engineering design and land surveying operations. KSN has provided civil engineering and land surveying services at Venice Island for over 10 years, and is very familiar with construction on the island. Mr. Ken Kjeldsen, president of KSN, has more than 16 years of experience and is the Reclamation District's current District Engineer for Venice Island. The **Sonoma Compost Company (SCC)** will provide guidance during composting of the rice straw. Established in 1985, SCC receives an average of 150 tons of yard waste per day and through its dealer network, markets over 50,000 cubic yards of compost and mulch annually throughout Northern California. SCC has worked closely with the California Integrated Waste Management Board to establish meaningful and realistic regulations for compost facilities. The **UC Davis Student Experimental Farm** will supply a site for composting and UC students will participate in the study under the direction of SCC. The **California Rice Industry Association** will provide continuing liaison with agribusiness in the Delta and Central Valley. **Allan Garcia**, who organically farms 1,000 acres of rice, will make rice straw available for the project and will work with us to develop the composting facility on his ranch. **The Nature Conservancy** (TNC) has agreed to establish a rice straw composting facility within TNC's Consumnes Preserve. This composting facility could also provide valuable "organic" soil amendments for rice growers within the Preserve, which would complement TNC's current efforts to transition its rice growing fields from conventional farming methods to organic methods. **Randy Baxter** and **Paul Raquel** of the **California Department of Fish and Game, Josh Collins, Ph.D.**, of the **San Francisco Estuary Institute**, and **Steve Deverel, Ph.D.** of **Hydrofocus** and a research associate of the **Learning Laboratory** (a CALFED funded laboratory created to investigate methods for reversing Delta island subsidence and tidal wetlands restoration) have agreed to participate on a Technical Advisory Panel. Mr. Baxter and Mr. Raquel are fisheries biologist who specialize in native Delta fishes. Dr. Collins has conducted studies in ecology, geomorphology, and land use to conserve plant, mammal, bird, and invertebrate populations and communities in marine, riverine, lacustrine, montane, and other terrestrial environments for the government and regulated industry. He also has produced guidelines sponsored by government to help translate science into public policy for ecological health of undeveloped lands. Dr. Deverel is an expert on processes in peat soils effecting subsidence and water quality. We will add any additional Technical Advisory Panel members in cooperation with CALFED and local area interested parties.

Potential Conflicts of Interest. To DWR's knowledge, we have no conflicts of interest with the actions or intentions of the CALFED Funding as of the date of this submittal.

TABLE 1: Laboratory Analysis Methods for Phase 1 Composting Studies and *Phase 3 Long-Term Monitoring*

Analytes	Method
TTLC CAM 17 Metals	EPA Method 6010/7000
Dissolved Oxygen	SM 4500G
Oxidation/Reduction	ASTM D1498-76
PH	EPA Method 9040
Organochlorine Pesticides	EPA Method 8080
Organophosphorous Pesticides	EPA Method 8140
Chlorinated Herbicides	EPA Method 8150
Biochemical Oxygen Demand	EPA Method 405.1
Chemical Oxygen Demand	EPA Method 410.4
Anions (Chloride, Sulfate, Nitrogen)	EPA Method 300
Alkalinity	EPA Method 310.1
TDS	EPA Method 160.1
Hardness	SM 23408
Conductivity	EPA Method 120.1
Dissolved Organic Carbon	EPA Method 360.2
Disinfectant Byproduct Precursors (analyzed during monitoring only)	Various Methods Specified During Monitoring
Methane (analyzed during monitoring only)	EPA Method 8015M

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Table 2: Preliminary Construction Cost Estimate, Venice Island Project, April 1999

Line	Description	Quantity	Units[1]	Unit Cost	Total Cost (Dollars)
1	*Direct Capitol Costs*				
2	**General**				
3	mobilization and demobilization	1	ls	$5,000	$5,000
4	clear and grub project, stockpile and staging areas	4	acre	$700	$2,800
6	cost to lease land	1	ls	$8,000	$8,000
7	relocate utilities	1	ls	$10,000	$10,000
8	post construction survey	1	ls	$10,000	$10,000
10	**Lowering of Existing Levee**				
11	clear and grub existing levee	2	acre	$1,500	$3,000
12	removal of existing rip rap	1000	lf	$40	$40,000
13	excavate and place levee fill in habitat area	14500	cy	$3	$43,500
15	breach construction	1	ls	$25,000	$25,000
18	**Construction of New Levee**				
19	foundation prep				
20	excavate trench (12'deep, 1:1 slopes)	1000	lf	$20	$20,000
21	place geotextile for base of new levee	1000	lf	$160	$160,000
22	install levee monitoring equipment	1	ls	$20,000	$20,000
23	supply levee add trench fill material				
24	dredge and barge to rehandling facility	105000	cy	n/c	$0
25	off load at rehandling facility	105000	cy	$1.5	$157,500
26	dry, scarify and stockpile for loading	105000	cy	$2.5	$262,500
27	load onto deck barge	105000	cy	$2	$210,000
28	barge material to Venice	105000	cy	$2	$210,000
29	off load, stockpile material at Venice	105000	cy	$2	$210,000
30	construct new levee (haul, dump, compact)	105000	cy	$3	$315,000
31	relocate exisiting irrigation ditches	1000	lf	$2	$2,000
32	placement of rip-rap on new levee	2250	tons	$40	$90,000
33					
34	**Habitat Area Construction**				
35	supply baled rice straw to Venice				
36	bale rice straw	650	acres	$70	$45,500
37	pickup bales from field, stack along road	750	tons	$12	$9,000
38	load bales, truck to Port, unload, load to barge	750	tons	$16	$12,000
39	barge material to Venice	750	tons	$21	$15,750
40	unload bales at Venice, stockpile	750	tons	$15	$11,250

I-016139

Table 2: Preliminary Construction Cost Estimate, Venice Island Project, April 1999

Line	Description	Quantity	Units[1]	Unit Cost	Total Cost (Dollars)
41	composting of rice straw				
42	field preparation	1	ls	$5,000	$5,000
43	compost rice straw (place, mix, rotate)	1200	tons	$30	$36,000
44	load compost, truck to Port, unload, load to barge	1200	tons	$16	$19,200
45	barge material to Venice	1200	tons	$21	$25,200
46	unload compost from barge, stockpile on Venice	1200	tons	$15	$18,000
47	supply dredged material to mix with rice straw	10000	cy	$10	$100,000
48	place fill mixture (haul, windrow, mix, grade)	26000	cy	$4	$91,000
49	supply and place sand fill material	24090	cy	$6	$144,540
50	**Total Direct Capital Costs:**				$1,897,800
51	*Indirect Capital Costs*				
52					
53	**General**				
54	construction management	1	ls	$70,000	$70,000
55	project man	1	ls	$5,000	$5,000
56					
57	**Total Indirect Capital Costs:**				$75,000
58	**Total Direct and Indirect Capital Costs:**				**$1,988,800**

[1] ls=lump sum n/c=assume no charge
lf=linear foot cy=cubic yard

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TABLE 3: Possible Permit Requirements

Agency	Possibnle Required Action	Approximate Processing Time
CEQA/NEPA	Initial Study/ Environmental Assessment-- Negative Declaration/Finding of No Significant Impact	3 months
U.S. Army Corps of Engineers	Section 404 (Clean Water Act)/10 (Rivers & Harbors Act) Permit	4 months
Central Valley Regional Water Quality Control Board	NPDES Permit/Waste Discharge Requirements; Water Quality Certification	1 to 3 months
California Dept. of Fish & Game	Streambed Alteration Agreement	2 months
National Marine Fisheries Service/ U.S. Fish & Wildlife Service	Section 7 (Endangered Species Act) consultation initiated by COE as part of Section 404/10 permit process	5 months
Local Reclamation District	Reviews any levee/flood control work	2 months

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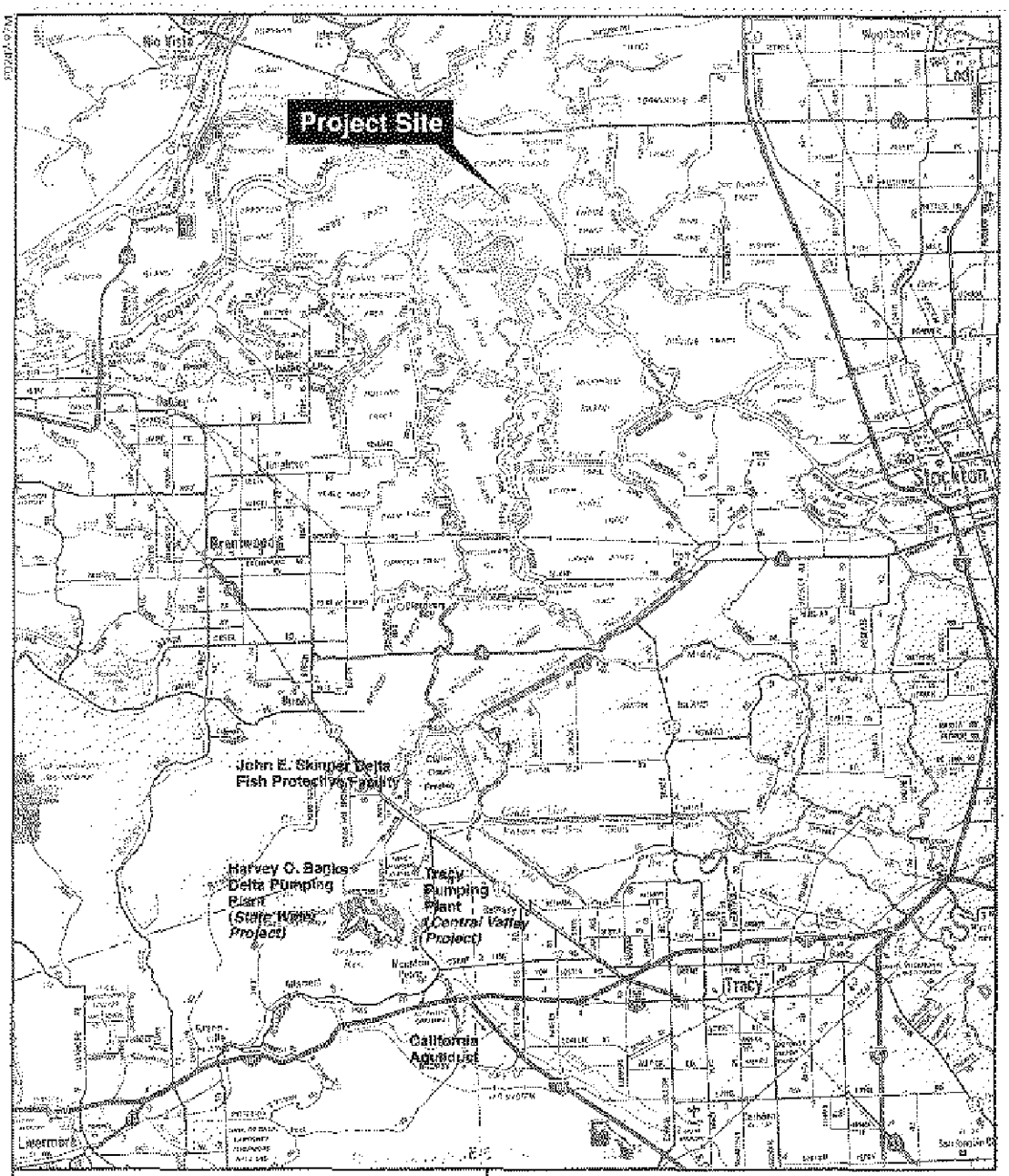
TABLE 4: Summary of Personnel Qualifications, Experience and Past Performance

Individual	Degrees	Experience	Past Performance
Rachel Bonnefil Permitting Specialist	B.A. Environmental Studies, 1991	Former employee of BCDC. Environmental review of dredging projects and major policies. Dredged materials reuse	• Montezuma Wetlands Project • Oro Loma Marsh Enhancement Project • San Francisco Bay Regional Wetland Ecosystem Goals Project
J. Scott Seyfried, R.P.S.S. Soil Scientist	M.S. Water Science, 1987; B.A. Physical Geography, 1983	Fate and transport of organic and inorganic chemicals in the subsurface, soil and water chemistry, risk assessment and bioremediation of soil and groundwater	• Marley Way Marsh Restoration Project • Montezuma Wetlands Project • Biological Damage Assessment, Donner Oil Spill, Donner, CA
Mavis Hasey Senior Ecologist	M.S. Plant Ecology, 1988; B.A. Environmental Biology 1982	Ecological and toxicological assessment of terrestrial and aquatic ecosystems; wetlands delineation and assessment; planning, permitting, and design of restoration projects; and quantitative ecological data analysis	• Rogers Dry Lake Ecosystem Analysis, Edwards Air Force Base • Ecological Restoration of Riparian & Oak Woodlands, Alameda County, CA
Kirk Lennington Biologist	B.A. Environmental Studies/Biology, 1993	Vertebrate and plant biology; GIS; species identification and monitoring; biological damage assessment and monitoring; reference site identification and assessment; tidal reckoning; permitting	• Biological Effects Monitoring, Valdez Oil Spill, Prince William Sound, AK • Martin Luther King Jr. Wetlands Restoration Project
Maya Khosla Fisheries Biologist	M.S. Environmental Biology, 1994; M.S. Chemistry, 1988; B.S. Chemistry, 1985	Study of the long-term effects of contaminants on fish biochemistry, physiology, populations and communities; field and laboratory assessments, habitat assessments and suitability studies on endangered salmonids; ecological restoration and ecotoxicology	• Biological Damage Assessment, Donner Oil Spill, Donner, CA • Marsh Restoration, Parr Boulevard, Richmond, CA
Christopher Nardi, G.E., Geotechnical Engineer	M.S. Geotechnical Engineering, 1981; B.S. Civil Engineering, 1978	Geotechnical, hazardous waste, & civil engineering for levees, dams, embankments, & related earth structures; wetlands designs; landslides; low- to mid-rise structures, R&D buildings, & office and industrial parks; & residential areas	• Martin Luther King Jr. Wetlands Restoration Project • Montezuma Wetlands Project
Claude Drugan Design Engineer	B.S. Environmental Engineering, 199-2	Demography & geologic/hydrogeologic conditions; investigation and remediation; regulatory negotiations; permitting, compliance monitoring, and reporting.	• Walnut Creek Desilting Project



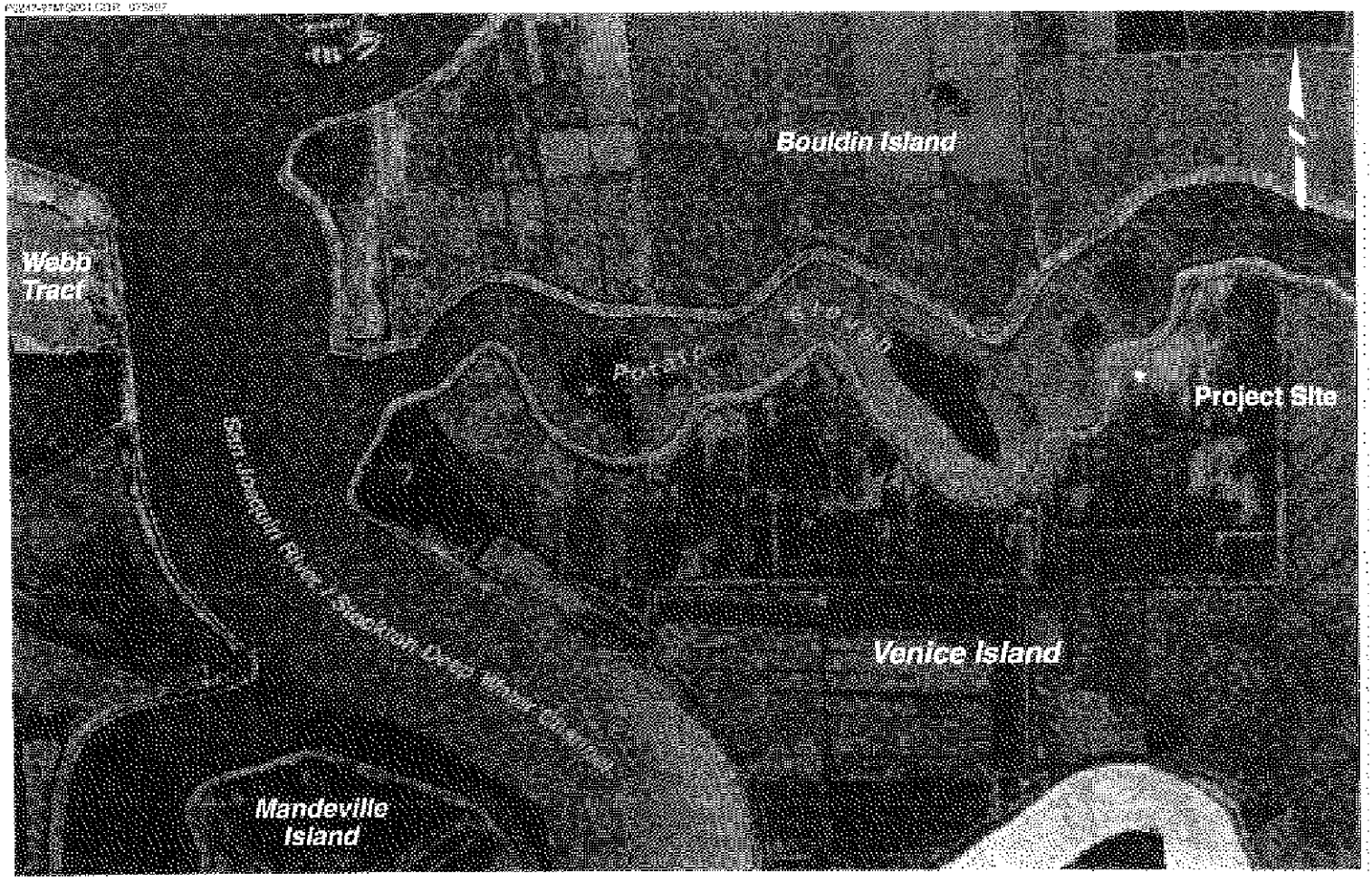
VENICE ISLAND

Site Location Map

Figure 1

I —0 1 6 1 4 3

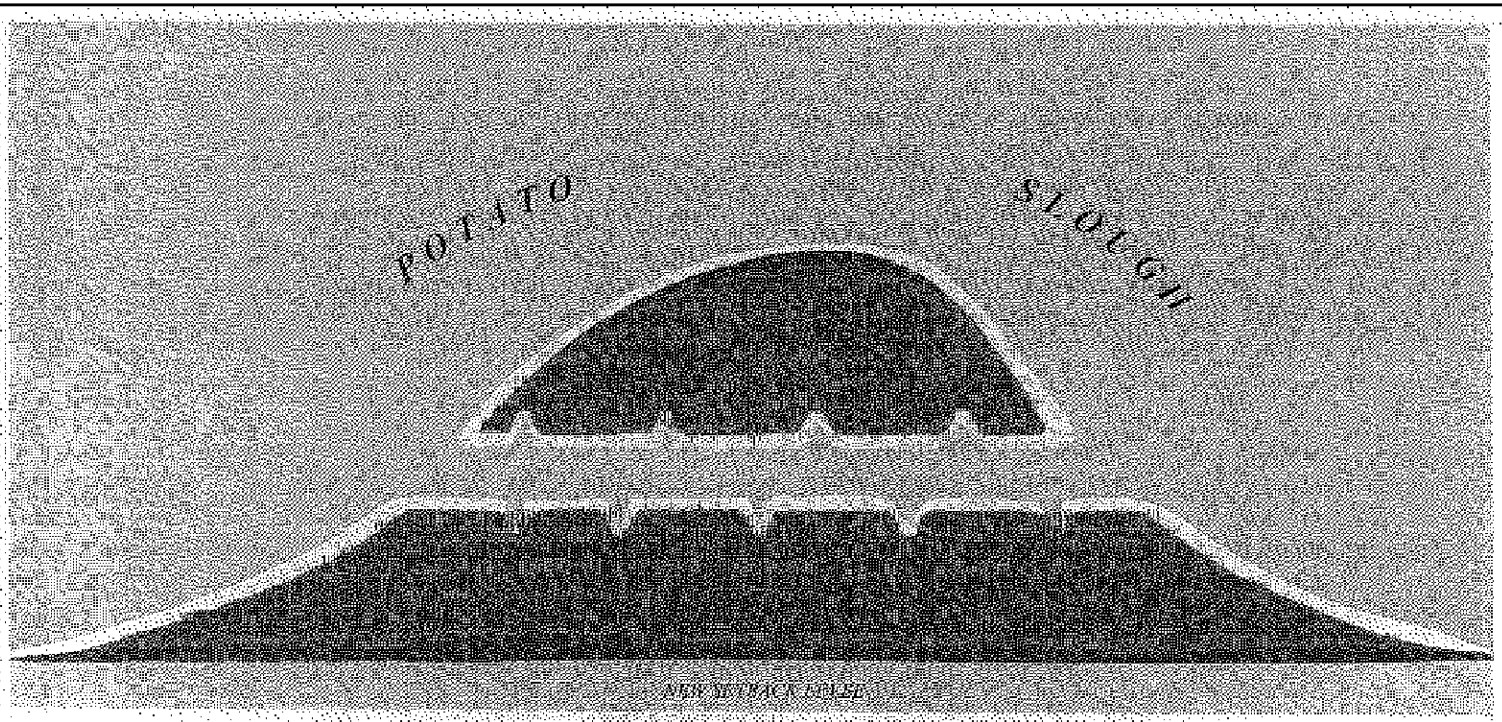
I-016143



Venice Island - Site Vicinity Map

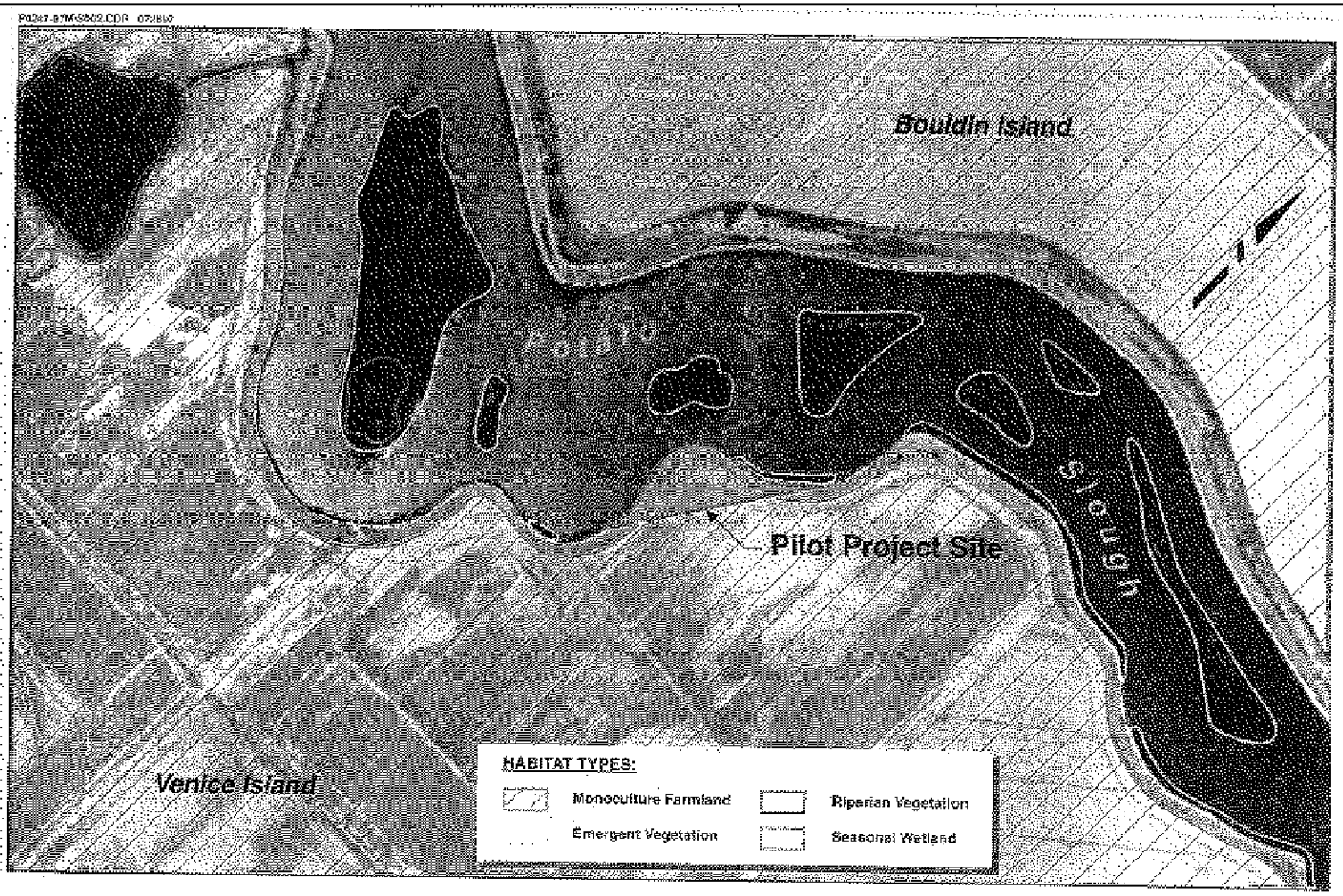
Figure 2

I-016144



Anticipated Ecological Habitats

Figure 3



Venice Island - Existing Ecological Habitats

Figure 4

I-016146

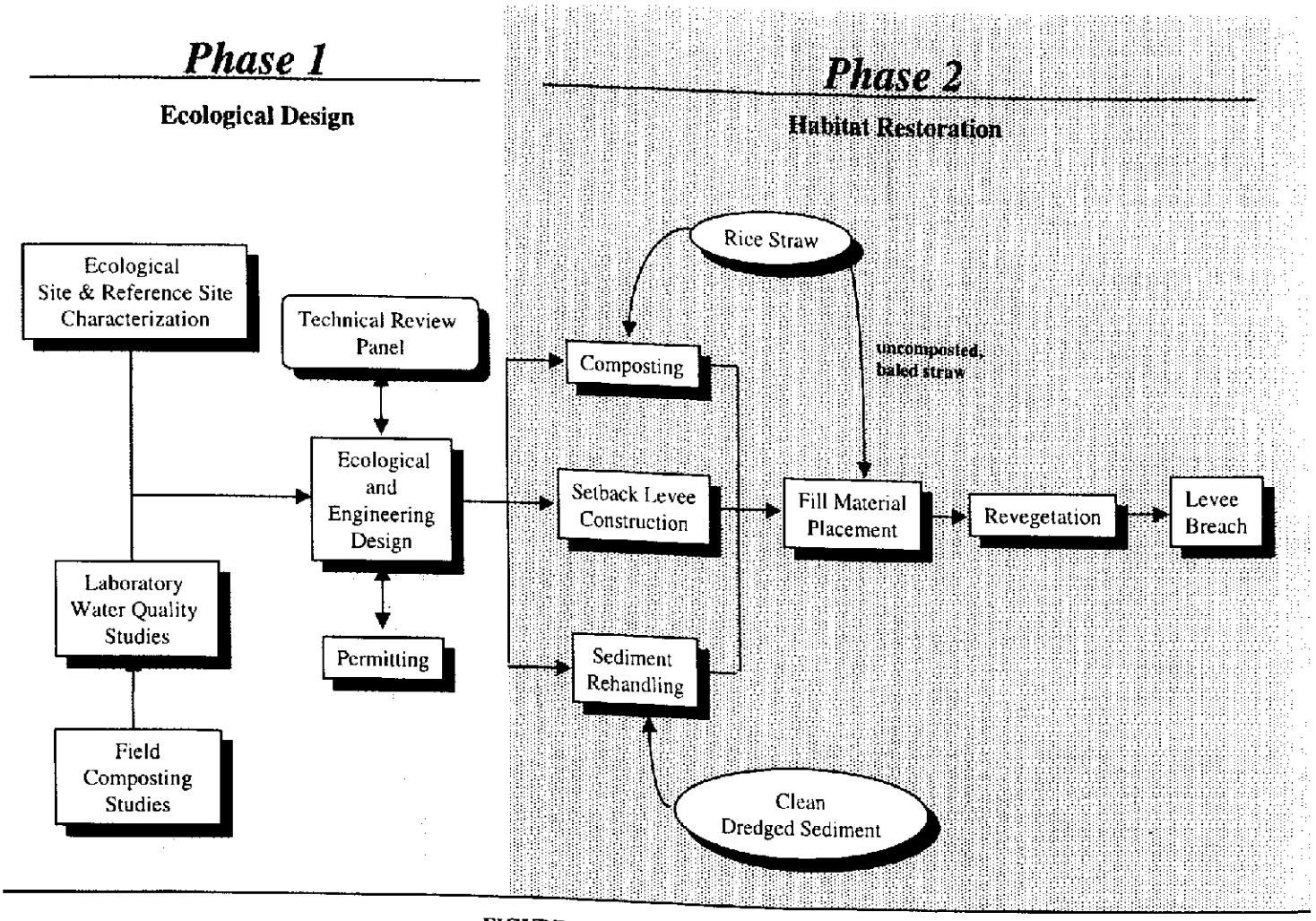


FIGURE 5: Phase 1 and 2 Flow Chart

I-016147

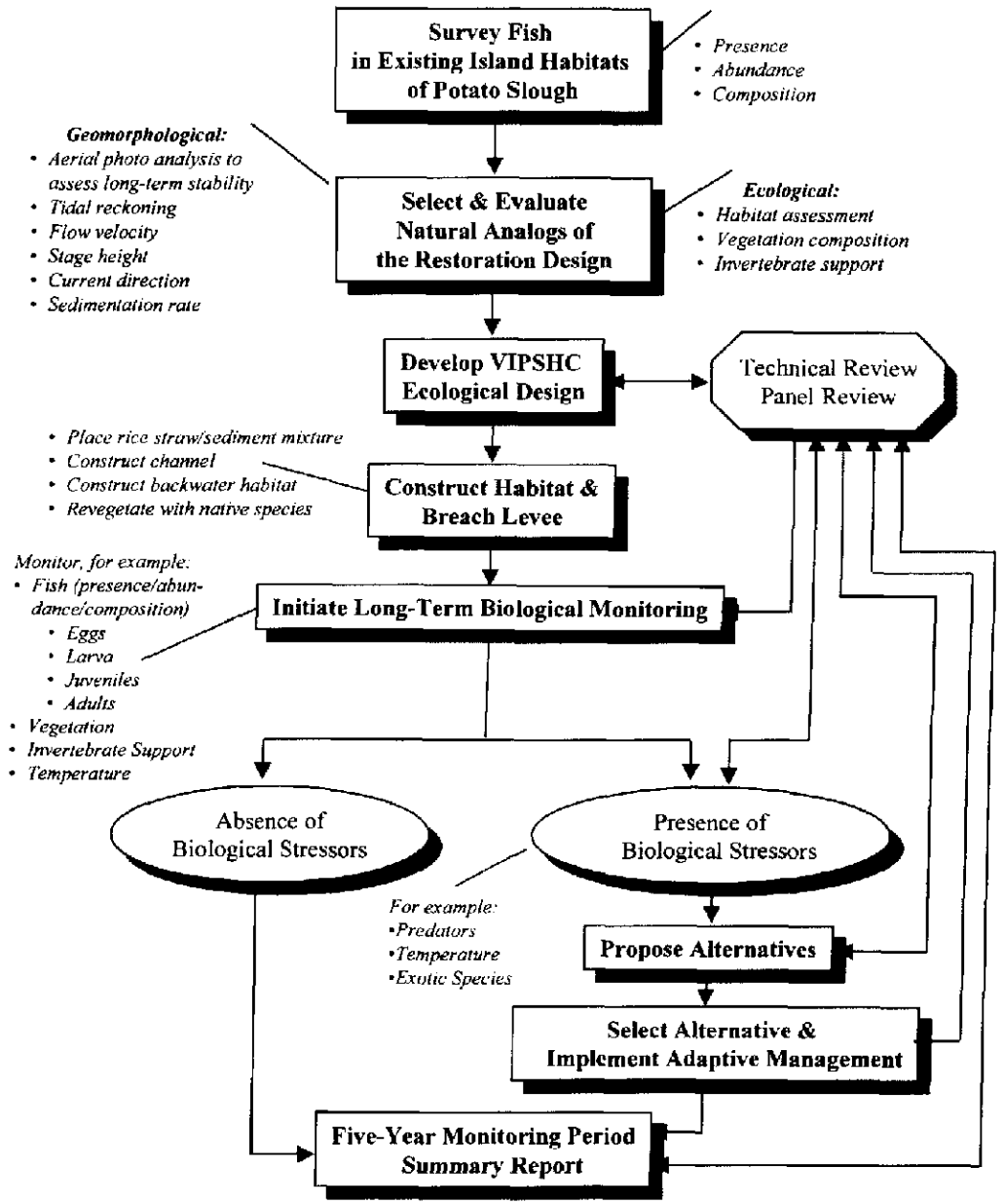


FIGURE 6: Adaptive Management Framework for Ecological Design of Venice Island/Potato Slough Habitat Creation Demonstration Project

I-016148

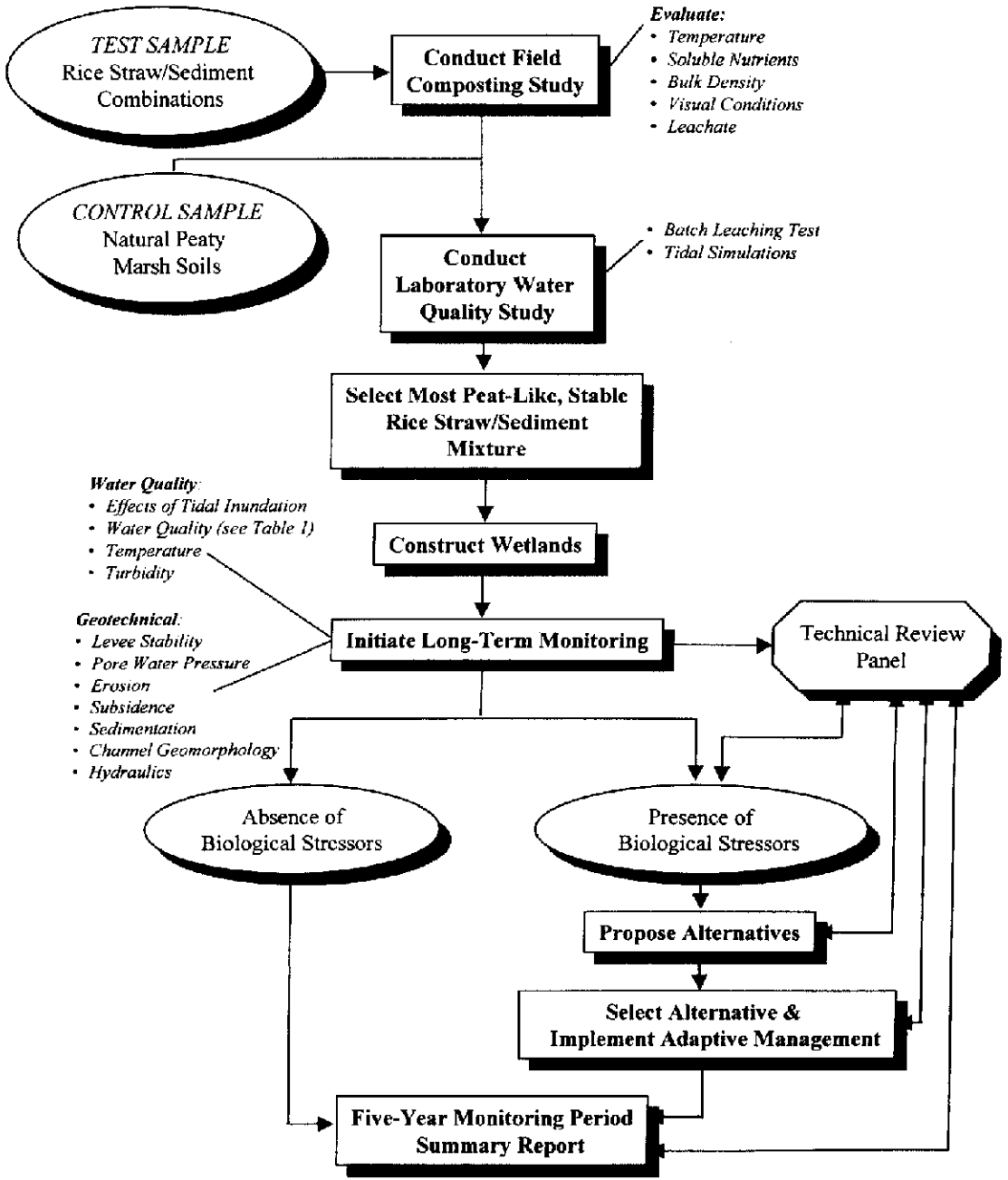
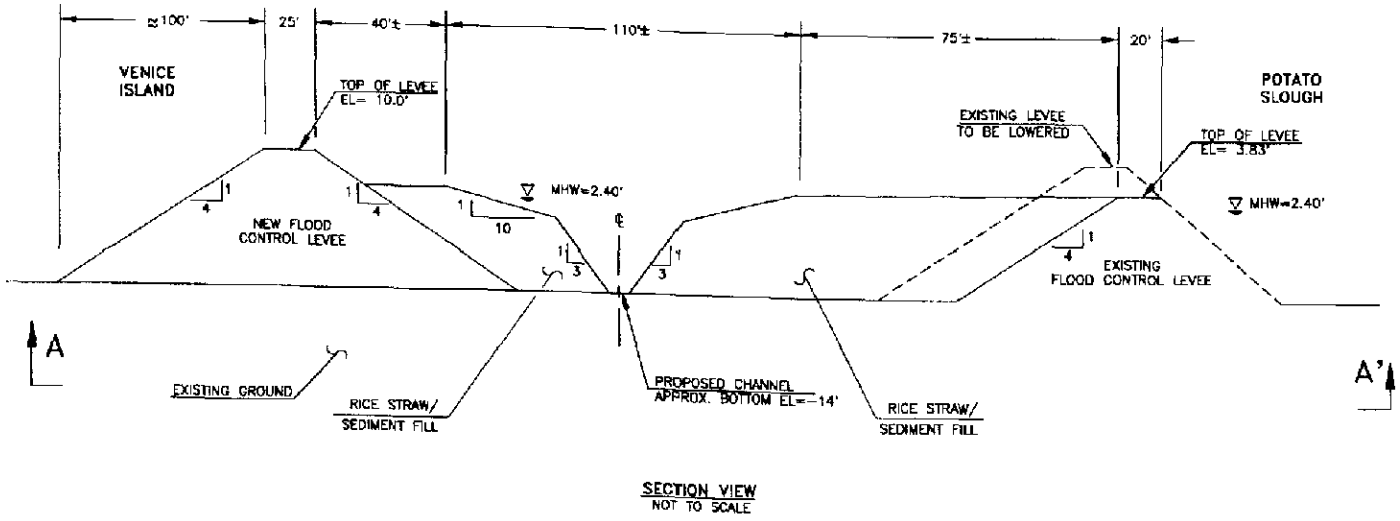


FIGURE 7: Adaptive Management Framework for Selecting & Evaluating Rice Straw/Sediment Mixtures as Habitat Creation Material



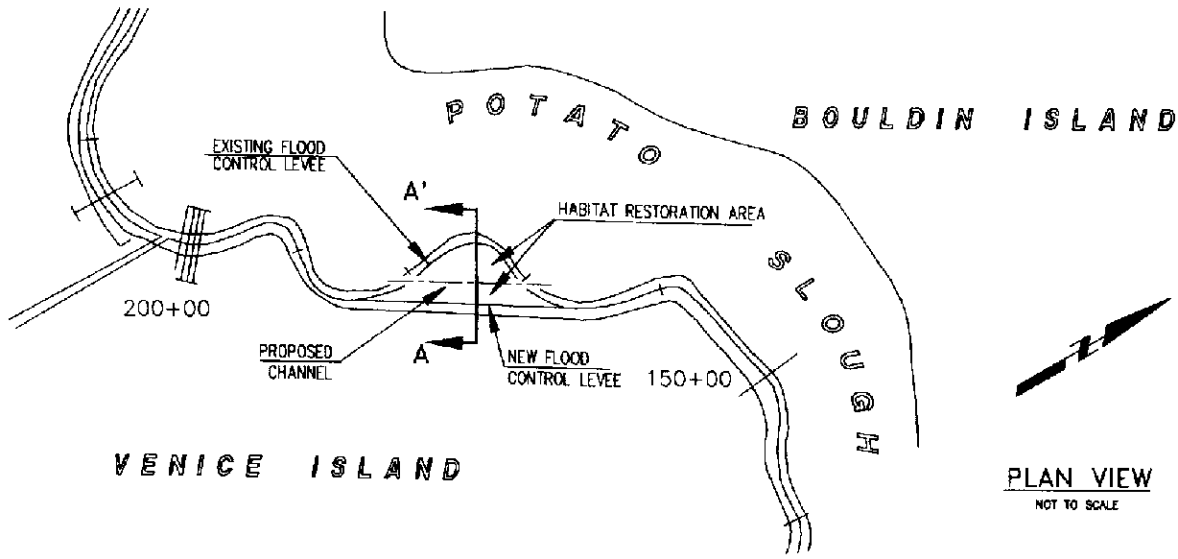
J:\ENGCAD\247-97N\FIG4.DWG

Venice Island Project

Levee Construction and Fish Habitat Creation
Section View

Figure 8

I-016150



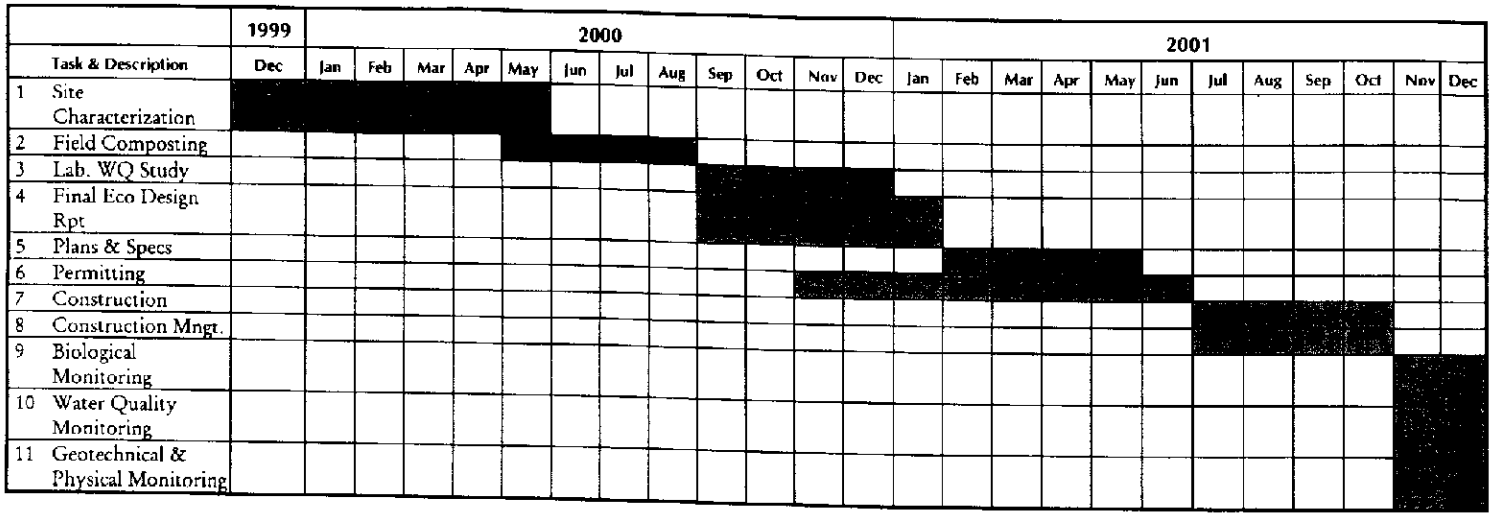
J:\ENGCAD\247-97M\FIG5.DWG

Venice Island Project

Levee Construction and Fish Habitat Creation
Plan View

Figure 9

I-016151



This schedule is dependent upon the presence of appropriate environmental conditions.

FIGURE 10

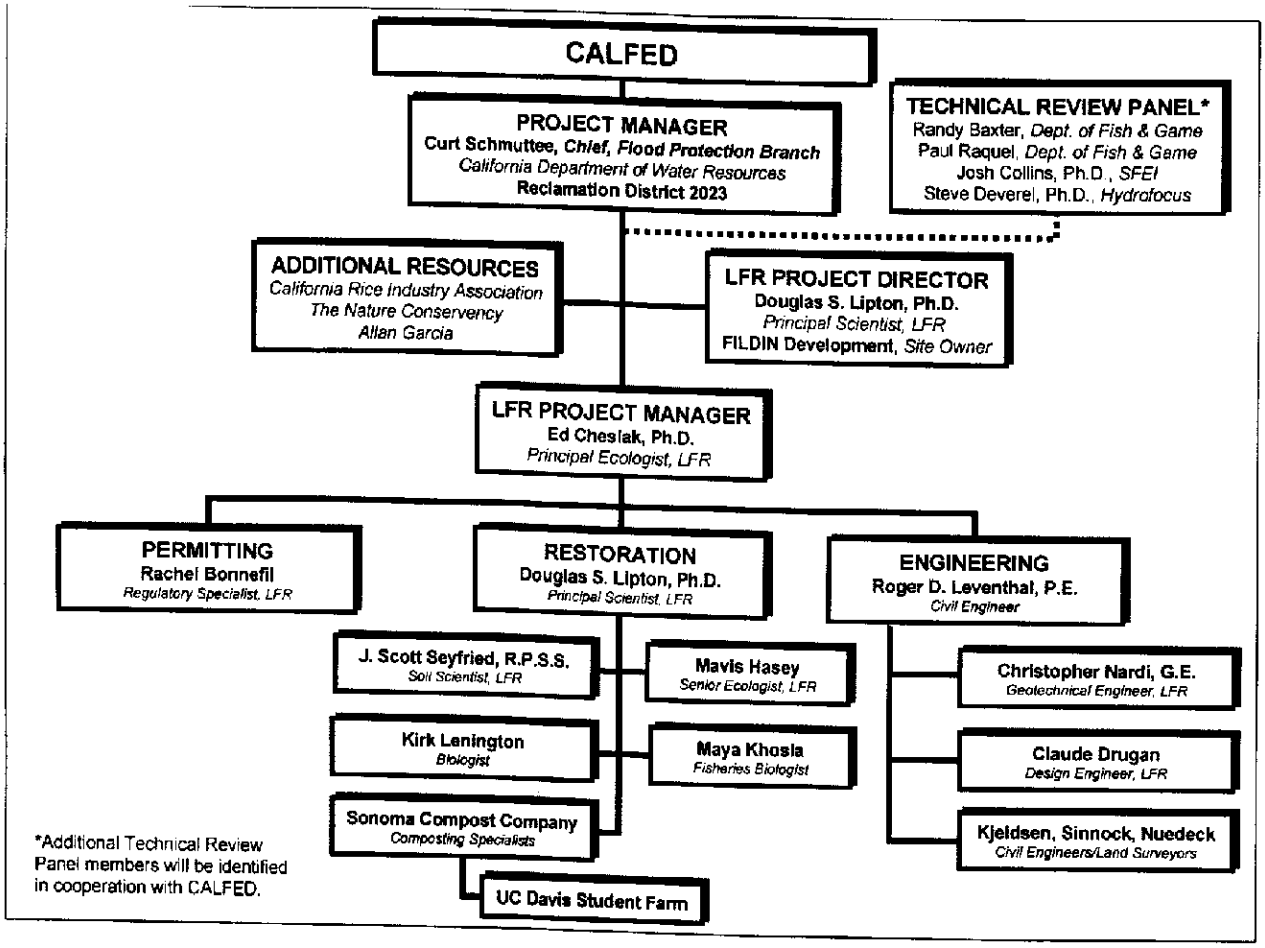


FIGURE 11